Efficacy of a Computerized Intervention on HIV and Intimate Partner Violence Among Substance-Using Women in Community Corrections: A Randomized Controlled Trial

Louisa Gilbert, PhD, Dawn Goddard-Eckrich, MS, Timothy Hunt, MS, Xin Ma, MS, Mingway Chang, PhD, Jessica Rowe, MDes, Tara McCrimmon, MPH, Karen Johnson, PhD, Sharun Goodwin, BS, Maria Almonte, MSW, and Stacey A. Shaw, PhD

Objectives. To test the efficacy of a computerized, group-based HIV and intimate partner violence (IPV) intervention on reducing IPV victimization among substance-using women mandated to community corrections.

Methods. Between November 2009 and January 2012, we randomly allocated 306 women from community corrections in New York City to 3 study arms of a computerized HIV and IPV prevention trial: (1) 4 group sessions intervention with computerized self-paced IPV prevention modules (Computerized Women on the Road to Health [WORTH]), (2) traditional HIV and IPV prevention intervention group covering the same HIV and IPV content as Computerized WORTH without computers (Traditional WORTH), and (3) a Wellness Promotion control group. Primary outcomes were physical, injurious, and sexual IPV victimization in the previous 6 months at 12-month follow-up.

Results. Computerized WORTH participants reported significantly lower risk of physical IPV victimization, severe injurious IPV victimization, and severe sexual IPV victimization at 12-month follow-up when compared with control participants. No significant differences were seen between Traditional WORTH and control participants for any IPV outcomes.

Conclusions. The efficacy of Computerized WORTH across multiple IPV outcomes highlights the promise of integrating computerized, self-paced IPV prevention modules in HIV prevention groups. (*Am J Public Health.* 2016;106:1278–1286. doi:10.2105/AJPH.2016.303119)

The intersecting epidemics of intimate partner violence (IPV) victimization and HIV are heavily concentrated among women who use drugs or alcohol (herein defined as substance-using women) in community corrections (i.e., probation, parole, drug treatment courts, community courts, and alternative-to-incarceration programs).[1–4] Rates of experiencing physical or sexual IPV in the past year range between 32% and 56% for substance-using women on probation and are 2 to 5 times higher than rates found among nationally representative samples of women.[5] Additionally, HIV prevalence rates among substance-using women mandated to community corrections in New York City range from 13% to 17%, which are comparable to rates found among women in sub-Saharan Africa.[6,7] Despite the elevated rates of IPV victimization, HIV, and other sexually transmitted infections (STIs) among this population of women, as well as accumulating research linking IPV victimization to HIV and STIs,[4,8] HIV prevention interventions that integrate IPV prevention among substance-using women remain scarce in community corrections settings.

Currently, about 1 million women are on probation, parole, or other types of community corrections nationwide, 70% of whom have a history of drug use.[9,10] Community corrections settings represent an untapped venue to reach numerous difficult-to-reach substance-using women who are at risk for both IPV victimization and HIV. Growing research has documented multiple "entwined and mutually enhancing" biological and behavioral mechanisms linking substance abuse, violence, and AIDS (SAVA) that are fueled by social and economic inequities, which has been conceptualized as the SAVA syndemic.[4,11–13] Substance-using women in community corrections have been disproportionately affected by the SAVA syndemic, because they often live in low-income urban communities that have concentrated HIV epidemics and high rates of violence and incarceration. Incarceration disrupts intimate relationships and pushes households into poverty, increasing the likelihood of women having multiple sex partners and engaging in survival sex.[14,15] Substance-using women in community corrections also are more likely to experience sexual assault, further

ABOUT THE AUTHORS

Louisa Gilbert, Dawn Goddard-Eckrich, Timothy Hunt, Xin Ma, Mingway Chang, Tara McCrimmon, Karen Johnson, and Stacey A. Shaw are with Social Intervention Group, Columbia University, New York, NY. Jessica Rowe is with Columbia Center for New Media Teaching and Learning, New York, NY. Sharun Goodwin is with The New York City Department of Probation, New York, NY. Maria Almonte is with Bronx Community Solutions, Center for Court Innovation, Bronx, NY.

Correspondence should be sent to Louisa Gilbert, PhD, Social Intervention Group, Columbia University School of Social Work, 1255 Amsterdam Ave, Room 832, New York, NY 10027 (e-mail: lg123@columbia.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

This article was accepted February 4, 2016.

doi: 10.2105/AJPH.2016.303119

increasing their risk for HIV.[16] Despite the large and growing population of women in community corrections programs in the United States affected by the SAVA syndemic, a recent systematic review identified only 4 interventions that reduced HIV risk behaviors for women in community corrections and none that reduced physical or sexual IPV.[16]

A recent meta-analysis identified sexual IPV as an independent risk factor for HIV infection among women.[17] Biologically, the risk of HIV acquisition increases during forced sex with HIV-positive partners as a result of vaginal and anal lacerations and an altered stress response from the immune system.[18] Multiple structural, biological, and behavioral syndemic mechanisms link IPV victimization to substance misuse and a wide range of HIV transmission risks.[4,12] Strong bidirectional associations have been established between use of different drugs and alcohol and all types of IPV victimization among women, including sexual IPV.[19,20] Among substance-using women, IPV victimization not only has been found to increase the likelihood of sharing injection drug equipment,[21] having multiple sexual partners,[8] exchanging sex for money or drugs,[15] acquiring STIs,[8] and not using condoms[8] but also is associated with not getting tested for HIV, not accessing HIV care, not adhering to antiretroviral medication, and failing to achieve viral load suppression.[12,22] Taken together, this research underscores the need for integrated behavioral HIV and IPV prevention interventions that can efficiently target the unique syndemic risks among substance-using women.

A small but growing body of research indicates that integrated behavioral IPV and HIV interventions are efficacious in reducing sexual HIV risks among women at risk for experiencing IPV.[4,23] Although the IPV prevention content in these HIV interventions has ranged in type, intensity, and modality, common components include raising awareness of IPV, screening for IPV, safety planning, identifying IPV service needs and referrals, and increasing sexual negotiation skills.[4] A recent systematic review of 44 best-evidence US-based HIV prevention interventions identified by the Centers for Disease Control and Prevention[23] ascertained 5 HIV interventions that addressed IPV and reduced 1 or more HIV risks. To our knowledge, however, only 2 integrated interventions have been found to be efficacious in reducing IPV among women.[24,25] To date, no integrated interventions have emerged that have shown efficacy in reducing the syndemic risk of sexual IPV (i.e., forced sex by an intimate partner) among substance-using women.

Emerging literature suggests the promise of brief computerized self-paced IPV prevention intervention tools that may be integrated in HIV interventions for substance-using women.[4] Compared with human-delivered interventions, computerized self-paced IPV prevention interventions have been found to be more effective in identifying and addressing IPV among women in health care settings.[26] Integrating computerized self-paced IPV prevention modules into group-based HIV interventions may have several advantages in addressing IPV among substance-using women over the traditional group format, including a greater likelihood of ensuring that all group members will complete IPV prevention activities, resulting in higher fidelity and precision of implementation. A computerized self-paced module also may ensure greater confidentiality and privacy among substance-using women who may fear legal or social consequences from disclosing IPV in a group setting.[26] To our knowledge, however, no integrated HIV and IPV prevention interventions have used computerized self-paced IPV prevention modules among substance-using women or women in general.

This study addressed a critical gap in HIV and IPV prevention research by testing the efficacy of a group-based computerized HIV and IPV prevention intervention (WORTH—Women on the Road to Health) in reducing the risk of IPV victimization among substance-using women in community corrections. A recent publication from this randomized controlled trial found that WORTH, whether delivered in a format with computerized self-paced and interactive group modules (Computerized WORTH) or in a traditional group format (Traditional WORTH), was efficacious in decreasing the number of unprotected sexual acts over the 12-month follow-up period, which was the primary outcome of this randomized controlled trial, compared with a Wellness Promotion attentional control group among 306 substance-using women in community corrections.[7] The primary aim of this study was to examine whether Computerized WORTH was more efficacious in reducing the risk of different types of IPV victimization at the 12-month follow-up, which was a secondary outcome of this randomized controlled trial, when compared with the Wellness Promotion control condition. We also examined whether Traditional WORTH was more efficacious than Wellness Promotion in reducing risk of IPV victimization at the 12-month follow-up.

METHODS

This randomized controlled trial was conducted in New York City between November 2009 and January 2012. We have described detailed methods, sample characteristics, and sample power calculations elsewhere[7] and included the CONSORT study flow diagram in Figure A (available as a supplement to the online version of this article at http://www.ajph.org).

Recruitment and Eligibility

Research assistants actively recruited and screened 1104 women from multiple community corrections sites by handing out flyers and inviting women to be screened. Of the 1104 women, 306 were eligible and were enrolled in the study. Eligible women reported

- being aged 18 years or older;
- being mandated to community corrections (i.e., probation, parole, community court, drug treatment court, or an alternative-to-incarceration program) in the past 90 days;
- using illicit drugs, binge drinking, or attending a substance abuse treatment program in the past 90 days;
- engaging in unprotected vaginal or anal intercourse within the past 90 days; and
- having at least 1 other HIV risk factor.

We conducted repeated assessments at 3-, 6-, and 12-month postintervention follow-ups at a centrally located community research office, but IPV outcomes were assessed only at 6- and 12-month follow-ups. Participants were reimbursed for completing assessments and intervention sessions up to a maximum of $265. More details on participant recruitment and retention are described in a previous publication.[7]

Randomization and Masking

A study investigator randomly assigned groups of 4 to 9 women to 1 of 3 study conditions; a computer-generated randomization algorithm was designed to balance the number of women per study arm via an adaptive, biased-coin procedure.[27] A total of 103 participants were assigned to Computerized WORTH, 101 to Traditional WORTH, and 102 to Wellness Promotion.

Investigators were masked to treatment assignment until the final 12-month follow-up assessment was completed in April 2013. Data were locked in September 2013, after which study arms were unmasked.

Intervention and Control Conditions

Traditional WORTH, consisting of a 4-session group HIV and IPV prevention intervention, is an evidence-based HIV intervention that was originally tested with women in jail[28] and in drug treatment.[29] For this study, we made minor modifications to WORTH to make it more contextually relevant for substance-using women in community corrections, such as addressing criminal justice–related triggers for unsafe sex and IPV (e.g., resisting drug use with a partner being released from prison).[28,29] The intervention was informed by social cognitive learning theory, which focuses on observation, modeling, and skill rehearsal through role play and feedback from group members.[30] Empowerment theory also guided a strengths-based approach of WORTH to build collective efficacy of women to negotiate safe relationships and counter stigma that they face as women in community corrections.[31]

Interventions were conducted at a community research site. A detailed description of IPV prevention content in Traditional and Computerized WORTH is provided in the box on the next page.[7] IPV-related components included risk reduction problem-solving and negotiation skills, awareness-raising of IPV, IPV triggers for unsafe sex and drug use, IPV screening and feedback, safety planning, social support to increase safety, identification of service needs and linkage to services, and IPV prevention goal setting.[32] For Traditional WORTH, all components, including IPV prevention activities, were conducted in a group setting. Two facilitators led group activities face-to-face once per week, with sessions lasting from 90 to 120 minutes.

Computerized WORTH also consisted of 4 weekly group sessions lasting 90 to 120 minutes, led by 2 facilitators. Computerized WORTH covered the same core components as Traditional WORTH, while employing group and individual interactive computerized games, video enhancements, and visual tools.[32] During each session, participants used individual laptops to independently view video vignettes of 4 fictional role models to promote identification and emotional engagement. Computerized self-paced modules covered the same IPV screening, prevention, and service referral activities that were conducted in the Traditional WORTH arm. Some activities (e.g., safety plan and IPV service referrals) were recorded in an electronic log that was printed for participants.

The Wellness Promotion control arm also consisted of 4 weekly group sessions lasting between 90 and 120 minutes, designed to control for modality and dosage. Core components of this psychoeducational intervention were adapted from an evidence-based wellness promotion intervention[33] and included maintaining a healthy diet, promoting fitness in daily routines, addressing tobacco use, learning stress-reduction exercises including guided meditation, and setting and achieving personal health goals.[33] None of the Wellness Promotion activities focused on IPV prevention.

Measures

IPV victimization outcomes. The primary outcomes for this study focused on different types of IPV victimization in the past 6 months. These outcomes were assessed at baseline, 6-month follow-up, and 12-month follow-up with a shortened 8-item version of the Revised Conflict Tactics Scale,[34] which includes 3 subscales measuring any sexual, physical, and injurious IPV within the past 6 months (responses were dichotomized as yes or no). These subscales contained items that assessed minor or severe IPV by type of IPV. Internal consistency of the Revised Conflict Tactics Scale subscales ranges between 0.79 and 0.95.[35]

Sociodemographic variables. Participants self-reported sociodemographic characteristics including gender, age, ethnicity, marital status, years of education, employment, monthly income, homelessness, the types of community corrections settings where they had enrolled in the past 90 days, and the number of times they had been arrested or incarcerated in jail or prison.

Current and past substance use. We used the Risk Behavior Assessment[36] to assess use of illicit drugs ever and within the past 90 days. To assess binge drinking, we asked whether participants consumed 4 or more alcoholic drinks within a 6-hour period.[37]

Analysis Plan

Consistent with the intent-to-treat approach, we estimated intervention effects by analyzing participant responses based on their experimental assignment. Because some missing data were the result of loss to follow-up at postintervention assessments, we used all available data at any follow-up visit in the statistical models. The 87% or higher retention rate at each follow-up did not differ significantly by condition. Attrition analyses, which compared sociodemographic characteristics of those who completed all follow-up assessments (completers) with those who missed 1 or more follow-up assessments (noncompleters), identified that completers on average were older (42 vs 39 years) and less likely to report homelessness (8% vs 18%). We estimated that with a sample of 112 women per arm, the study would have 80% statistical power, assuming an α level of .05, 2-sided hypothesis testing, no covariance adjustment, and intraclass correlations of 0.05 for the primary study outcomes previously published.[7]

WOMEN ON THE ROAD TO HEALTH (WORTH) INTIMATE PARTNER VIOLENCE (IPV) PREVENTION INTERVENTION COMPONENTS

Aim of WORTH Activity	Traditional WORTH Activity	Computerized WORTH Activity
Enhance sexually transmitted infection (STI) and HIV knowledge and perceived risk and identify attitudes toward safer sex and condom use.	Facilitator uses myth or fact statements and reading of case studies to transfer knowledge and correct misperceptions.	Participants play interactive game, watch culturally tailored videos, and respond to questions on a computer screen.
Identify and avoid unsafe sex and drug-related risks.	In group format, participants discuss triggers, including fear of IPV and substance use; share experiences; and read a case example to apply problem solving to reduce risks for unsafe sex.	Participants review potential triggers for unsafe sex, which include fear of IPV and substance misuse, and identify own triggers for unsafe sex or risky drug use on their computer (self-paced activity). Using a video model, the group applies a problem-solving model to avoid triggers and reduce risks.
Practice sexual negotiation, sexual safety planning, and problem-solving skills.	Facilitator discusses steps of negotiating condom use, reads a case example, and facilitates role play.	Video scenarios model sexual negotiation skills and sexual safety planning to avoid risky sexual encounters. Group identifies steps in negotiation and engages in role-play practice.
Improve linkage to services and promote HIV testing and care.	Facilitator reviews HIV testing options, provides resource manual, encourages participants to identify psychosocial needs, and uses manual to contact organizations to address HIV, IPV, and other services, facilitating group discussion about barriers to service access.	Computerized demonstration of HIV testing and exposure window assessment assists in prioritizing psychosocial needs and links to Web-based information to access community services (self-paced activity). Facilitators can access logs and assist in addressing barriers to accessing services for HIV, IPV, and other issues.
Reduce IPV and enhance supportive network.	Facilitator raises awareness about different types of IPV and supports the completion of individual IPV assessment and safety planning to reduce IPV risks. Participants are asked to identify sources of social support and service referrals that may reduce their IPV risks.	Participants use a video and audio tool to learn about different types of IPV, confidentially identify IPV risks, provide feedback on IPV risks, and develop a safety plan to reduce IPV risks (self-paced activity). Computerized, interactive tool helps women to identify sources of social support and IPV services that may help them reduce their IPV risks (self-paced activity).

We used logistic regression models with random effects to evaluate the effects of the intervention arms on IPV victimization in the past 6 months at each follow-up. All random-effects regression models included the dummy codes for intervention and modality effects and the baseline measure of the outcome of interest to estimate the effects for the follow-up period; we added the follow-up assessment time (in months) and interaction terms between time and dummy codes to yield the effects for each follow-up assessment. We grouped membership and repeated measures of a participant at each time point. We used a bootstrapping strategy that calculates estimates' SEs and *P* values to compensate for multiple comparisons.[38] The data were resampled 2000 times for each regression model. We used SAS version 9.3 (SAS Institute, Cary, NC) for all analyses. We reported odds ratios (ORs) and 95% confidence intervals (CIs) for these effects.

RESULTS

Sociodemographic, substance use, HIV, and lifetime IPV victimization characteristics of participants are reported in Table 1. The mean age of participants was 41.5 (SD = 10.5). A total of 208 participants (68%) identified as Black or African American, and 47 (15.4%) identified as Latina. Two thirds (n = 202; 66.0%) were single and never married. Only 25 women (8.2%) were employed, and 278 (90.8%) had ever been in prison or jail. Of the women, 194 (63.4%) reported using illicit drugs in the past 90 days. About one quarter (n = 81; 26.5%) tested positive for an STI, and 43 (14.1%) tested positive for HIV.

We did not find significant differences in any of the characteristics by study condition (Table 1).

TABLE 1—Background Characteristics and Intimate Partner Violence (IPV) Prevalence, by Study Arm: New York City, 2009–2012

	Total (n = 306), Mean ±SD or No. (%)	Wellness (n = 102), Mean ±SD or No. (%)	Traditional (n = 101), Mean ±SD or No. (%)	Computerized (n = 103), Mean ±SD or No. (%)
Age, y	41.5 ±10.5	42.1 ±9.7	41.9 ±10.8	40.5 ±10.9
Race/ethnicity				
Black	208 (68.0)	68 (66.7)	67 (66.3)	73 (70.9)
Latina	47 (15.4)	15 (14.7)	17 (16.8)	15 (14.6)
Other	51 (16.7)	19 (18.6)	17 (16.8)	15 (14.6)
High school or general equivalency diploma	176 (57.5)	55 (53.9)	66 (65.3)	55 (53.4)
Marital status				
Single	202 (66.0)	66 (64.7)	70 (69.3)	66 (64.1)
Married	49 (16.0)	18 (17.6)	12 (11.9)	19 (18.4)
Divorced/separated/widowed	55 (18.0)	18 (17.6)	19 (18.8)	18 (17.5)
Employment	25 (8.2)	9 (8.8)	7 (6.9)	9 (8.7)
Homeless, past 90 d	29 (9.5)	9 (8.8)	8 (7.9)	12 (11.7)
In inpatient drug treatment facility, past 90 d	63 (20.6)	23 (22.5)	15 (14.9)	25 (24.3)
Hospitalized for mental health or health reasons, past 90 d	40 (13.1)	13 (12.7)	9 (8.9)	18 (17.5)
Incarcerated in jail or prison, past 90 d	73 (23.9)	22 (21.6)	24 (23.8)	27 (26.2)
Ever in jail or prison	278 (90.8)	92 (90.2)	95 (94.1)	91 (88.3)
Community court, past 90 d	70 (22.9)	28 (27.5)	21 (20.8)	21 (20.4)
On probation, past 90 d	107 (35.0)	33 (32.4)	34 (33.7)	40 (38.8)
On parole, past 90 d	40 (13.1)	19 (18.6)	12 (11.9)	9 (8.7)
Drug court, past 90 d	47 (15.4)	13 (12.7)	16 (15.8)	18 (17.5)
Alternative-to-incarceration program, past 90 d	23 (7.5)	9 (8.8)	6 (5.9)	8 (7.8)
Ever used heroin	65 (21.2)	32 (31.4)	17 (16.8)	16 (15.5)
Used heroin, past 90 d	30 (9.8)	18 (17.6)	6 (5.9)	6 (5.8)
Ever used crack/cocaine	246 (80.4)	84 (82.4)	81 (80.2)	81 (78.6)
Used crack/cocaine, past 90 d	118 (38.6)	46 (45.1)	40 (39.6)	32 (31.1)
Ever used marijuana	267 (87.3)	85 (83.3)	90 (89.1)	92 (89.3)
Used marijuana, past 90 d	117 (38.2)	36 (35.3)	42 (41.6)	39 (37.9)
Ever injected drugs	69 (22.5)	32 (31.4)	19 (18.8)	18 (17.5)
Injected drugs, past 90 d	22 (7.2)	11 (10.8)	5 (5.0)	6 (5.8)
Ever used any illicit drug	300 (98.0)	99 (97.1)	99 (98.0)	102 (99.0)
Used any illicit drug, past 90 d	194 (63.4)	67 (65.7)	63 (62.4)	64 (62.1)
Ever engaged in binge drinking	174 (56.9)	54 (52.9)	64 (63.4)	56 (54.4)
Engaged in binge drinking, past 90 d	93 (30.4)	25 (24.5)	36 (35.6)	32 (31.1)
HIV positive	43 (14.1)	13 (12.7)	12 (11.9)	18 (17.5)
Any sexually transmitted infection	81 (26.5)	29 (28.4)	23 (22.8)	29 (28.2)
Ever experienced				
Any physical IPV	185 (60.5)	58 (56.9)	66 (65.3)	61 (59.2)
Any injurious IPV	177 (57.8)	51 (50.0)	67 (66.3)	59 (57.3)
Any sexual IPV	166 (54.2)	54 (52.9)	62 (61.4)	50 (48.5)
Severe physical IPV	170 (55.6)	53 (52.0)	62 (61.4)	55 (53.4)
Severe injurious IPV	151 (49.3)	44 (43.1)	54 (53.5)	53 (51.5)
Severe sexual IPV	117 (38.2)	40 (39.2)	37 (36.6)	40 (38.8)

TABLE 2—Prevalence of Intimate Partner Violence (IPV) Experiences in a Group-Based Computerized HIV and IPV Prevention Intervention (Women on the Road to Health) in Past 6 Months at Baseline, 6-Month Follow-Up, and 12-Month Follow-Up Assessments, by Study Condition: New York City, 2009–2012

	Baseline (n = 306 Randomized), No. (%)			6-Month Follow-Up (n = 277), No. (%)			12-Month Follow-Up (n = 278), No. (%)		
Study IPV Condition	Computerized (n = 103)	Traditional (n = 101)	WP Control (n = 102)	Computerized (n = 94)	Traditional (n = 91)	WP Control (n = 92)	Computerized (n = 91)	Traditional (n = 93)	WP Control (n = 94)
Any physical	16 (15.5)	7 (6.9)	8 (7.8)	14 (14.9)	9 (9.9)	11 (12.0)	8 (8.8)	12 (12.9)	17 (18.1)
Any injurious	11 (10.7)	7 (6.9)	11 (10.8)	8 (8.5)	10 (11.0)	8 (8.7)	7 (7.7)	6 (6.5)	14 (14.9)
Any sexual	12 (11.7)	7 (6.9)	12 (11.8)	12 (12.8)	9 (9.9)	11 (12.0)	7 (7.7)	9 (9.7)	11 (11.7)
Severe physical	15 (14.6)	7 (6.9)	6 (5.9)	8 (8.5)	7 (7.7)	7 (7.6)	6 (6.6)	9 (9.7)	12 (12.8)
Severe injurious	8 (7.8)	6 (5.9)	6 (5.9)	5 (5.3)	8 (8.8)	7 (7.6)	4 (4.4)	6 (6.5)	13 (13.8)
Severe sexual	5 (4.9)	1 (1.0)	3 (2.9)	5 (5.3)	6 (6.6)	6 (6.5)	2 (2.2)	4 (4.3)	8 (8.5)

Note. WP = Wellness Promotion.

Intimate Partner Violence Over Time by Study Condition

Among women in Computerized WORTH, rates of all types of IPV and severe IPV victimization in the past 6 months decreased from baseline to the 12-month follow-up. However, these rates did not decrease in either the Traditional WORTH or the Wellness Promotion control conditions (Table 2).

Intervention Outcomes

In Table 3, we present the results from random-effects logistic regression models of IPV victimization outcomes at 12 months postintervention, comparing Computerized WORTH and Traditional WORTH with Wellness Promotion control participants. The risk of experiencing physical IPV in the past 6 months was significantly lower at 12-month follow-up in Computerized WORTH when compared with the Wellness Promotion control arm (8.8% vs 18.1%; OR = 0.38; 95% CI = 0.15, 0.96; $P = .041$). Compared with Wellness Promotion control participants, Computerized WORTH participants also were less likely to experience severe injurious IPV in the past 6 months at the 12-month follow-up (4.4% vs 13.8%; OR = 0.24; 95% CI = 0.07, 0.87; $P = .030$) as well as severe sexual IPV (e.g., rape or forced sex; 2.2% vs 8.5%; OR = 0.22; 95% CI = 0.06, 0.80; $P = .021$).

Table 3 presents random-effects logistic regression models of IPV victimization outcomes at 12 months postintervention, comparing Traditional WORTH with Wellness Promotion participants. We did not find any significant differences between Traditional WORTH and Wellness Promotion participants in IPV victimization outcomes at 12 months postintervention.

DISCUSSION

In this randomized controlled trial, the risks of experiencing different types of IPV victimization in the previous 6 months were significantly lower at the 12-month follow-up among Computerized WORTH participants compared with Wellness Promotion control participants. Compared with Wellness Promotion control participants, Computerized WORTH participants were 62% less likely to report experiencing any physical IPV at the 12-month follow-up, 76% less likely to report injurious IPV, and 78% less likely to report severe sexual IPV (i.e., forced sex). Although the effects of Computerized WORTH were consistent across the different types of IPV, the significance of effects varied by severity of IPV, with stronger significant effect sizes for severe sexual IPV and severe injurious IPV. The magnitude and sustainability of results across IPV outcomes at the 12-month follow-up suggest the efficacy and clinical significance of Computerized WORTH in preventing IPV.

To our knowledge, this was the first randomized controlled trial to find significant effects of an integrated IPV and HIV prevention intervention on preventing IPV victimization among substance-using women in community corrections and on reducing the risk of forced sex among substance-using women. This outcome is particularly noteworthy given the high rates of sexual IPV and the syndemic mechanisms linking forced sex and HIV transmission found among substance-using women.[18]

The lack of significant differences in IPV outcomes at the 6-month follow-up between Computerized WORTH and control conditions is consistent with some IPV intervention studies, which found stronger effects at 12 months than at 6 months postintervention.[24,39] The delayed effect of WORTH on reducing IPV suggests that it may take more time for women on average to successfully implement their safety planning skills to avoid risks for IPV, access services, and leave abusive partners.

No significant differences were found between Traditional WORTH and Wellness Promotion in the likelihood of experiencing any type of IPV at the 12-month follow-up. The study findings highlight that the modality of delivering group interventions addressing IPV prevention is critical and suggest the efficacy of a hybrid approach of integrating computerized self-paced modules in group-based

TABLE 3—Group-Based Computerized HIV and Intimate Partner Violence (IPV) Prevention Intervention (WORTH—Women on the Road to Health) Effects on IPV Victimization Outcomes, by Duration of Follow-Up: New York City, 2009–2012

Outcome	6-Month Follow-Up, OR (95% CI)	12-Month Follow-Up, OR (95% CI)
Any physical IPV		
WP control (Ref)	1	1
Computerized WORTH	1.13 (0.49, 2.63)	0.38 (0.15, 0.96)
Traditional WORTH	0.80 (0.31, 2.08)	0.67 (0.31, 1.45)
Severe physical IPV		
WP control (Ref)	1	1
Computerized WORTH	0.95 (0.33, 2.76)	0.41 (0.15, 1.12)
Traditional WORTH	0.97 (0.31, 3.04)	0.73 (0.30, 1.79)
Severe injurious IPV		
WP control (Ref)	1	1
Computerized WORTH	0.60 (0.17, 2.13)	0.24 (0.07, 0.87)
Traditional WORTH	1.14 (0.44, 2.98)	0.44 (0.19, 1.02)
Any injurious IPV		
WP control (Ref)	1	1
Computerized WORTH	0.89 (0.34, 2.33)	0.43 (0.15, 1.20)
Traditional WORTH	1.33 (0.58, 3.03)	0.43 (0.18, 1.05)
Severe sexual IPV		
WP control (Ref)	1	1
Computerized WORTH	0.76 (0.21, 2.83)	0.22 (0.06, 0.80)
Traditional WORTH	1.03 (0.29, 3.69)	0.49 (0.15, 1.60)
Any sexual IPV		
WP control (Ref)	1	1
Computerized WORTH	0.96 (0.39, 2.35)	0.55 (0.18, 1.68)
Traditional WORTH	0.81 (0.33, 2.00)	0.87 (0.36, 2.12)

Note. CI = confidence interval; OR = odds ratio; WP = Wellness Promotion.

interventions. Research and multimedia learning theory suggest several factors that may explain the superior outcomes of Computerized WORTH on reducing risk of IPV, including (1) greater confidentiality of using a computerized tool that enables women to identify and address IPV risks, (2) greater fidelity of implementation and likelihood of engaging all group participants in IPV prevention activities, (3) the use of narrative characters that resonate with the target population who can model core skills, and (4) the use of both visual and verbal channels to enhance processing of IPV prevention information.[26,40]

Limitations and Strengths

Because this study was conducted with a heterogeneous sample of substance-using women from a range of community corrections settings, the findings are not generalizable to any one type of community corrections setting or any one type of substance use. Because research suggests that women who experience IPV often perpetrate IPV, which also increases the likelihood of engaging in a range of HIV risk behaviors,[41] future research should evaluate the efficacy of intervention models in identifying and addressing IPV perpetration or mutual IPV in addition to IPV victimization. This study did not assess psychological IPV, which is also associated with a range of HIV risk behaviors.[4]

This study, however, had numerous strengths, including random assignment, small loss to follow-up, an active comparison and control group, high fidelity of implementing intervention conditions confirmed by quality assurance, and blind assessment of outcomes.

Conclusions and Recommendations

Consistent with previous research,[5,6] elevated rates of experiencing physical, sexual, and injurious IPV along with the very high rates of HIV and STIs previously found in this sample of substance-using women in community corrections settings[6,7] underscore the urgent need for scaling up integrated IPV and HIV prevention interventions. The outcomes of this trial expand the evidence base of computerized self-paced IPV interventions that have been found to be effective in identifying and addressing IPV among general populations of women[26] and more recently among substance-using women.[42] The multiple syndemic mechanisms linking IPV victimization and HIV among substance-using women suggest that reducing the risk of all types of IPV, particularly forced sex, is critical for reducing the risk of acquiring HIV and STIs. Study findings further suggest the efficacy of computerized syndemic-focused HIV interventions on reducing risks of different types of IPV, including rape or forced sex, among substance-using women. Computerized self-paced IPV prevention tools have the added benefit of scalability in resource-constrained community corrections settings because they require less staff training and supervision to implement and thus may yield a greater cost benefit while ensuring greater implementation fidelity.[32]

Despite the promising effects of Computerized WORTH in reducing IPV, further research is needed to determine whether certain groups of people (e.g., those with minor IPV, low literacy, older age, or cognitive impairment) may respond better to traditional group formats for IPV prevention. Such research should examine the relative effectiveness of computerized self-paced versus traditional group modules in addressing the key mediators of WORTH to inform the optimal hybrid combination of traditional group and computerized self-paced activities. Identifying the key mediators associated with both IPV prevention and HIV risk reduction also may guide the design of hybrid interventions to most efficiently target

the SAVA syndemic mechanisms among substance-using women in community corrections.

Finally, implementation research is needed to evaluate the effectiveness and cost-effectiveness of delivering Computerized WORTH on reducing IPV victimization and HIV and STIs in community supervision settings. This research may elucidate key organizational, community, and structural factors to consider in scaling up Computerized WORTH in different community corrections settings to curb the IPV and HIV syndemic among substance-using women. AJPH

CONTRIBUTORS

L. Gilbert was responsible for conceptualizing and designing the study, analyzing and interpreting the outcomes, and writing the article. D. Goddard-Eckrich assisted with designing and managing the study and writing the article. T. Hunt assisted with conceptualizing the study, overseeing the implementation of the interventions for all 3 conditions, and interpreting results. X. Ma and M. Chang contributed to analyzing and interpreting the data. J. Rowe assisted with conceptualizing and designing the Computerized Women on the Road to Health intervention. T. McCrimmon and K. Johnson assisted with summarizing the literature and interpreting results. S. Goodwin and M. Almonte assisted with implementing the study and collecting the data. S. A. Shaw assisted with interpreting results and writing the article. All authors contributed to the article.

ACKNOWLEDGMENTS

The study was funded by the National Institute on Drug Abuse to Nabila El-Bassel (R01DA025878).

The authors would like to thank the women who participated in Women on the Road to Health (WORTH) for sharing their time and experiences with us and the community supervision sites that graciously hosted WORTH. We also want to thank the case managers who facilitated WORTH as well as project research assistants.

Note. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the article.

HUMAN PARTICIPANT PROTECTION

Institutional review boards at Columbia University and the Center for Court Innovation approved study protocols prior to implementation. We obtained written informed consent from participants.

REFERENCES

1. Campbell JC, Lewandowski LA. Mental and physical health effects of intimate partner violence on women and children. *Psychiatr Clin North Am*. 1997;20(2):353–374.

2. Coker AL, Davis KE, Arias I, Desai S, Sanderson M. Physical and mental health effects of intimate partner violence for men and women. *Am J Prev Med*. 2002;23:260–268.

3. Lipsky S, Krupski A, Roy-Byrne P, Lucenko B, Mancuso D, Huber A. Effect of co-occurring disorders and intimate partner violence on substance abuse treatment outcomes. *J Subst Abuse Treat*. 2010;38(3):231–244.

4. Gilbert L, Raj A, Hien D, Stockman J, Terlikbayeva A, Wyatt G. Targeting the SAVA (substance abuse, violence and AIDS) syndemic among women and girls: a global review of epidemiology and integrated interventions. *J Acquir Immune Defic Syndr*. 2015;69:S118–S127.

5. Golder S, Hall MT, Logan TK, et al. Substance use among victimized women on probation and parole. *Subst Use Misuse*. 2014;49(4):435–447.

6. Belenko S, Langley S, Crimmins S, Chaple M. HIV risk behaviors, knowledge, and prevention education among offenders under community supervision: a hidden risk group. *AIDS Educ Prev*. 2004;16(4):367–385.

7. El-Bassel N, Gilbert L, Goddard-Eckrich D, et al. Efficacy of a group-based multimedia HIV prevention intervention for drug-involved women under community supervision: Project WORTH. *PLoS One*. 2014;9(11):e111528.

8. El-Bassel N, Gilbert L, Witte S, Wu E, Chang M. Intimate partner violence and HIV among drug-involved women: contexts linking these two epidemics-challenges and implications for prevention and treatment. *Subst Use Misuse*. 2011;46:295–306.

9. Guydish J, Chan M, Bostrom A, Jessup M, Davis T, Marsh C. A randomized trial of probation case management for drug-involved women offenders. *Crime Delinq*. 2011;57(2):167–198.

10. Maruschak LM, Glaze L, Boncizar T. *Adults on Probation in the United States, 1977–2012*. Washington, DC: Bureau of Justice Statistics; 2013. Annual Probation Survey Data Series.

11. González-Guarda RM, Florom-Smith AL, Thomas T. A syndemic model of substance abuse, intimate partner violence, HIV infection, and mental health among Hispanics. *Public Health Nurs*. 2011;28(4):366–378.

12. Meyer JP, Springer SA, Altice FL. Substance abuse, violence, and HIV in women: a literature review of the syndemic. *J Womens Health (Larchmt)*. 2011;20(7):991–1006.

13. Singer M. AIDS and the public health crisis of the US urban poor: the perspective of critical medical anthropology. *Soc Sci Med*. 1994;39:931–948.

14. Khan MR, Behrend L, Adimora AA, Weir SS, White BL, Wohl DA. Dissolution of primary intimate relationships during incarceration and implications for post-release HIV transmission. *J Urban Health*. 2011;88(2):365–375.

15. Strathdee SA, West BS, Reed E, Moazan B, Azim T, Dolan K. Substance use and HIV among female sex workers and female prisoners: risk environments and implications for prevention, treatment, and policies [published erratum appears in *J Acquir Immune Defic Syndr*. 2015;69(3):e119]. *J Acquir Immune Defic Syndr*. 2015;69(suppl 2):S110–S117.

16. Underhill K, Dumont D, Operario D. HIV prevention for adults with criminal justice involvement: a systematic review of HIV risk-reduction interventions in incarceration and community settings. *Am J Public Health*. 2014;104(11):e27–e53.

17. Li Y, Marshall CM, Rees HC, Nunez A, Ezeanolue EE, Ehiri JE. Intimate partner violence and HIV infection among women: a systematic review and meta-analysis. *J Int AIDS Soc*. 2014;17:18845.

18. Stockman JK, Lucea MB, Campbell JC. Forced sexual initiation, sexual intimate partner violence and HIV risk in women: a global review of the literature. *AIDS Behav*. 2013;17(3):832–847.

19. Gilbert L, El-Bassel N, Chang M, Wu E, Roy L. Substance use and partner violence among urban women seeking emergency care. *Psychol Addict Behav*. 2012;26(2):226–235.

20. Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen SM. Drug abuse and aggression between intimate partners: a meta-analytic review. *Clin Psychol Rev*. 2008;28(2):247–274.

21. Decker MR, Miller E, McCauley HL, et al. Recent partner violence and sexual and drug-related STI/HIV risk among adolescent and young adult women attending family planning clinics. *Sex Transm Infect*. 2014;90(2):145–149.

22. Schwartz RM, Weber KM, Schecter GE, et al. Psychosocial correlates of gender-based violence among HIV-infected and HIV-uninfected women in three US cities. *AIDS Patient Care STDS*. 2014;28(5):260–267.

23. Prowse KM, Logue CE, Fantasia HC, Sutherland MA. Intimate partner violence and the CDC's best-evidence HIV risk reduction interventions. *Public Health Nurs*. 2014;31(3):215–233.

24. Peragallo N, Gonzalez-Guarda RM, McCabe BE, Cianelli R. The efficacy of an HIV risk reduction intervention for Hispanic women. *AIDS Behav*. 2012;16(5):1316–1326.

25. Wechsberg WM, Luseno WK, Lam WK, Parry CD, Morojele NK. Substance use, sexual risk, and violence: HIV prevention intervention with sex workers in Pretoria. *AIDS Behav*. 2006;10(2):131–137.

26. Nelson HD, Bougatsos C, Blazina I. Screening women for intimate partner violence: a systematic review to update the US Preventive Services Task Force recommendation. *Ann Intern Med*. 2012;156(11):796–808.

27. Wei LJ, Smythe RT, Smith RL. *K*-Treatment comparisons with restricted randomization rules in clinical trials. *Ann Statist*. 1986;14(1):265–274.

28. El-Bassel N, Ivanoff A, Schilling RF, Gilbert L, Borne D, Chen DR. Preventing HIV/AIDS in drug-abusing incarcerated women through skills building and social support enhancement: preliminary outcomes. *Soc Work Res*. 1995;19(3):131–141.

29. Tross S, Campbell AN, Cohen LR, et al. Effectiveness of HIV/STD sexual risk reduction groups for women in substance abuse treatment programs: results of a NIDA clinical trials network trial. *J Acquir Immune Defic Syndr*. 2008;48(5):581–589.

30. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.

31. Peled E, Eisikovits Z, Enosh G, Winstok Z. Choice and empowerment for battered women who stay: toward a constructivist model. *Soc Work*. 2000;45(1):9–25.

32. Khan MR, Epperson MW, Gilbert L, et al. The promise of multimedia technology for STI/HIV prevention: frameworks for understanding improved facilitator delivery and participant learning. *AIDS Behav*. 2012;16(7):1949–1960.

33. El-Bassel N, Jemmott JB, Landis JR, et al. National Institute of Mental Health multisite Eban HIV/STD prevention intervention for African American HIV serodiscordant couples: a cluster randomized trial. *Arch Intern Med*. 2010;170(17):1594–1601.

34. Jiwatram-Negrón T, El-Bassel N. Systematic review of couple-based HIV intervention and prevention studies: advantages, gaps, and future directions. *AIDS Behav*. 2014;18(10):1864–1887.

35. Straus MA, Hamby SL, Boney-McCoy S, Sugarman DB. The Revised Conflict Tactics Scales (CTS2): development and preliminary psychometric data. *J Fam Issues*. 1996;17(3):283–316.

36. Needle R, Fisher DG, Weatherby N, et al. Reliability of self-reported HIV risk behaviors of drug users. *Psychol Addict Behav*. 1995;9(4):242–250.

37. Substance Abuse and Mental Health Services Administration. *Survey on Drug Use and Health: Summary of National Findings*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2013. NSDUH Series H-48.

38. Westfall PH, Young SS. *Resampling-Based Multiple Testing: Examples and Methods for P-Value Adjustment*. New York, NY: Wiley; 1993.

39. Tirado-Muñoz J, Gilchrist G, Farré M, Hegarty K, Torrens M. The efficacy of cognitive behavioural therapy and advocacy interventions for women who have experienced intimate partner violence: a systematic review and meta-analysis. *Ann Med*. 2014;46(8):567–586.

40. Nair NK, Newton NC, Shakeshaft A, Wallace P, Teesson M. A systematic review of digital and computer-based alcohol intervention programs in primary care. *Curr Drug Abuse Rev*. 2015;8(2):111–118.

41. Johnson JE, Peabody ME, Wechsberg WM, Rosen RK, Fernandes K, Zlotnick C. Feasibility of an HIV/STI risk-reduction program for incarcerated women who have experienced interpersonal violence. *J Interpers Violence*. 2015;30(18):3244–3266.

42. Gilbert L, Shaw SA, Goddard-Eckrich D, et al. Project WINGS (Women Initiating New Goals of Safety): a randomised controlled trial of a screening, brief intervention and referral to treatment (SBIRT) service to identify and address intimate partner violence victimization among substance-using women receiving community supervision. *Crim Behav Ment Health*. 2015;25(4):314–329.